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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,997	09/05/2003	Jon P. Daley	MI22-2380	7524

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WELLS ST. JOHN P.S.
601 W. FIRST AVENUE, SUITE 1300
SPOKANE, WA 99201

EXAMINER	
PERKINS, PAMELA E	
ART UNIT	**PAPER NUMBER**
2822	

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/655,997	DALEY, JON P.
	Examiner	Art Unit
	Pamela E. Perkins	2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 7-77* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18,51 and 71* is/are allowed.

6)☒ Claim(s) *1-4,7-17,19-50,52-70 and 72-77* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the filing of the RCE on 1 December 2005. Claims 1-4 and 7-77 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 7, 12, 17, 21, 22, 30, 37-40, 45, 50, 53, 60, 61, 65, 70 and 72-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buxbaum et al. (6,582,861) in view of Nagata et al. (6,956,980).

Referring to claims 1, 21, 30 and 53, Buxbaum et al. disclose a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating (106) is deposited over the semiconductor substrate (102), the antireflective coating (106) having an outer surface, the outer surface comprising a silicon nitride-containing material; applying a positive photoresist (108) onto the outer surface (col. 1, lines 55-68; col. 4, lines 1-16); patterning and developing the positive photoresist (108) effective to form a patterned photoresist layer having increased footing at a base region (col. 4, lines 25-28; col. 7, lines 32-35).

Buxbaum et al. do not disclose treating the outer surface with a basic fluid.

Nagata et al. disclose a method of forming a patterned photoresist layer over a semiconductor substrate where a silicon oxide layer (144) is deposited over the semiconductor substrate (141), the silicon oxide layer (144) having an outer surface; and applying a photoresist onto the outer surface (col. 1, lines 23-55). Nagata et al. further disclose treating the outer surface with amine, a basic fluid (col. 2, lines 15-21).

Since Buxbaum et al. and Nagata et al. are both from the same field of endeavor, a method of forming a patterned photoresist layer, the purpose disclosed by Nagata et al. would have been recognized in the pertinent art of Buxbaum et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Buxbaum et al. by treating the outer surface with a basic fluid as taught by Nagata et al. to improve adhesive between the silicon oxide layer and the photoresist (col. 2, lines 15-21).

Referring to claims, 2, 37, 60 and 75, Buxbaum et al. disclose the outer surface as organic (col. 4, lines 1-16).

Referring to claims 3, 38 and 61, Buxbaum et al. disclose the outer surface as inorganic (col. 4, lines 1-16).

Referring to claims 4, 39 and 76, Buxbaum et al. disclose the outer surface as silicon nitride (col. 4, lines 1-16).

Referring to claims 7, 40 and 72-74, Nagata et al. disclose the outer surface as silicon oxide (col. 1, lines 23-55).

Referring to claims 12, 45 and 65, Nagata et al. disclose the basic treating fluid is gaseous (col. 2, lines 15-21).

Referring to claims 17, 50 and 70, Nagata et al. disclose the basic treating fluid as amine, an alkyl amine (col. 2, lines 15-21).

Referring to claim 22, Buxbaum et al. disclose the photoresist as a negative photoresist (col. 1, lines 55-58).

Claims 8-11, 14, 15, 19, 20, 23-29, 31-36 41-44, 47, 48, 52, 54-59, 62-64, 67, 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buxbaum et al. in view of Nagata et al. as applied to claim1, 30 and 53 above, and further in view of Duval (5,955,244).

Buxbaum et al. in view of Nagata et al. disclose the subject matter claimed above expect the outer surface comprising silicon carbide, the basic treating fluid has a pH of at least 10.5, the basic treating fluid is liquid, treating is for no more than 1 minute, wherein the outer surface is reflective of incident radiation used in the patterning of the photoresist.

Duval discloses a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate (20), the antireflective coating having an outer surface (col. 7, lines 20-25); treating the outer surface with a basic fluid (col. 7, lines 25-29); applying a photoresist onto the outer surface which has been treated with the basic treating fluid (col. 7, lines 34-41); and patterning and developing the photoresist effective to form a patterned photoresist layer (22) (col. 8, lines 1-14).

Referring to claims 8, 41 and 77, Duval discloses the outer surface comprising silicon carbide (col. 4, lines 30-34).

Referring to claims 9, 10, 42, 43, 62 and 63, Duval discloses the basic treating fluid has a pH of at least 10.5 (col. 2, lines 62-63).

Referring to claims 11, 27, 35, 44, 58 and 64, Duval discloses the basic treating fluid is liquid (col. 5, lines 59-61).

Referring to claims 14, 47 and 67, Duval discloses the basic treating fluid comprises potassium hydroxide (col. 5, lines 5-14).

Referring to claims 15, 48 and 68, Duval discloses the basic treating fluid comprises sodium hydroxide (col. 5, lines 5-14).

Referring to claims 19 and 20, Duval discloses treating is for no more than 1 minute (col. 5, lines 65-67).

Referring to claims 23, 31 and 54, Duval discloses not exposing the outer surface to any liquid intermediate the treating and the applying (col. 4, lines 50-60).

Referring to claims 24, 25, 28, 32, 33, 36, 55, 56 and 59, Duval discloses drying outer surface intermediate the treating and the applying (col. 5, line 67 thru col.6, line 4).

Referring to claims 26, 34 and 57, Duval discloses not exposing the outer surface to any liquid intermediate the treating and the applying; and the outer surface is at least partially dried intermediate the treating and the applying (col. 4, lines 50-60; col. 5, line 67 thru col. 6, line 4).

Referring to claims 29 and 52, Duval discloses the outer surface is reflective of incident radiation used in said patterning of the photoresist (col. 3, lines 29-41).

Since Buxbaum et al. and Duval are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Duval would have been recognized in the pertinent art of Buxbaum et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Buxbaum et al. by the outer surface comprising silicon carbide, the basic treating fluid has a pH of at least 10.5, the basic treating fluid is liquid, treating is for no more than 1 minute, wherein the outer surface is reflective of incident radiation used in the patterning of the photoresist as taught by Duval to prevent reaction between the photoresist and the substrate (col. 1, lines 35-44).

Claims 13, 46, 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buxbaum et al. in view of Nagata et al. as applied to claims 1, 30 and 53 above, and further in view of Oberlander et al. (6,844,131).

Buxbaum et al. in view of Nagata et al. disclose the subject matter claimed above except the basic treating fluid comprising tetramethyl ammonium hydroxide.

Oberlander et al. disclose a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate, the antireflective coating having an outer surface; treating the outer surface; and applying a photoresist onto the outer surface which has been treated (col. 13, lines 8-32).

Referring to claims 13, 46 and 66, Oberlander et al. disclose treating the outer surface with tetramethyl ammonium hydroxide (col. 14, lines 2-15).

Since Buxbaum et al. and Oberlander et al. are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Oberlander et al. would have been recognized in the pertinent art of Buxbaum et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Buxbaum et al. by treating the outer surface with tetramethyl ammonium hydroxide as taught by Oberlander et al. to optimize the photoresist (col. 13, lines 25-29).

Claims 16, 49 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buxbaum et al. in view of Nagata et al. as applied to claims 1, 30 and 53 above, and further in view of Sahbari (6,350,560).

Buxbaum et al. in view of Nagata et al. disclose the subject matter claimed above except the basic treating fluid comprising ammonium fluoride.

Sahbari discloses a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate, the antireflective coating having an outer surface; and treating the outer surface (col. 2, lines 64-67).

Referring to claims 16, 49 and 69, Sahbari discloses treating the other surface with ammonium fluoride (col. 1, line 65 thru col. 2, line 1).

Since Buxbaum et al. and Sahbari are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Sahbari would have been recognized in the pertinent art of Buxbaum et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Buxbaum et al. by treating the other surface with ammonium fluoride as taught by Sahbari to prevent corrosion of the substrate (col. 2, lines 43-51).

Allowable Subject Matter

Claims18, 51 and 71 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: prior art does not anticipate, teach, or suggest performing the basic treating fluid is at room ambient temperature and room ambient pressure.

Response to Arguments

Applicant's arguments with respect to claims 1-4 and 7-77 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E. Perkins whose telephone number is (571)

272-1840. The examiner can normally be reached on Monday thru Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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